Avinash **Singh**

Postdoctoral Researcher | Core-Collapse Supernovae | Transient Astrophysics

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I am a postdoctoral researcher at the Oskar Klein Centre, Stockholm University, specializing in the observational study of core-collapse supernovae and explosive transients. My work focuses on optical, ultraviolet, and infrared observations, the physics of circumstellar interaction, explosion asymmetries, and understanding the progenitor systems driving diverse transient populations. I have extensive experience in developing data-reduction pipelines, multi-wavelength analysis tools, and survey simulations. I also regularly write observational and grant proposals, and I have mentored several undergraduate and graduate students during my research appointments in India, Japan, and Sweden.

Research Interests

- Investigating circumstellar material around progenitors of core-collapse supernovae (CCSNe)
- Probing explosion and CSM geometry from polarimetric and spectroscopic observations.
- Dust formation and its time-resolved evolution in interacting CCSNe
- Nebular Phase investigation of CCSNe through radiative transfer models
- Hydrodynamical light curve modelling of hydrogen-rich CCSNe
- Volumetric rate measurements of transients (SLSNe-I/II)
- Follow-up of Electromagnetic counterparts to gravitational-wave events
- Host environments of CCSNe, specifically 1987A-like explosions
- Development of reduction pipelines for classification and follow-up

Research Experience

Present – May 2024 | **Postdoctoral Researcher, The Oskar Klein Centre, Stockholm University, Stockholm, Sweden**
- Multi-wavelength investigation of Core-Collapse Supernovae
- Follow-up of potential electromagnetic counterparts to Gravitational wave events.
- Leading work on Nebular phase investigation of Flash SNe.

Mar 2024 – Apr 2021 | **Fixed-Term Assistant Professor, Hiroshima Astrophysical Science Center, Hiroshima University, Hiroshima, Japan**
- Led projects on follow-up of hydrogen-rich supernovae.
- Mentored multiple research students and teaching Undergraduate students.
- Development of image subtraction pipeline for Seimei/Kanata telescopes under J-GEM.
- Worked on host environments of core-collapse supernovae.

Mar 2021 – Sep 2020 | **Research Associate–I, ARIES, Nainital, India**
- Optical follow-up of low-redshift supernovae.
- Photometric calibration of the DOT 4kx4k Imager.
- Automating and homogenizing the historical data from ARIES telescopes for a data archival system

Education

Jun 2020 – Aug 2014 | **Doctor of Philosophy (Ph.D.), Astronomy & Astrophysics, Joint Astronomy Program, Indian Institute of Science (IISc), Bengaluru, India**
- Thesis: *Observational Studies of Core-Collapse Supernovae*
- Supervisor: Prof. G. C. Anupama

Jun 2013 – Jul 2009 | **Bachelor of Engineering (B.E.), Electronics & Communication Engineering, Birla Institute of Technology (BIT), Ranchi, India**
- Specialization project on the use of relays for improvement in wireless network capacity

2009 | **Higher Secondary Examination (12th, CBSE), Govt. Model Senior Secondary School, Port Blair, India**
2008 | › All India Senior School Certificate Examination (AISSCE) - Central Board of Secondary Education (CBSE)
› Secured **95.8%**

2007 | **Secondary Examination (10th, CBSE), Navy Children School, Port Blair, India**
2006 | › All India Secondary School Examination (AISSE) - Central Board of Secondary Education (CBSE)
› Secured **91.2%**

Scientific Collaborations

- **GROWTH** (Global Relay of Observatories Watching Transients Happen) 2018–2021, 2024–Present
- **JGEM** (Japanese collaboration for Gravitational wave ElectroMagnetic follow-up) 2022–2024
- **ZTF** (Zwicky Transient Facility) 2024–Present
- **ePESSTO** (extended Public ESO Spectroscopic Survey of Transient Objects) 2024–Present
- **ENGRAVE** (Electromagnetic counterparts of Gravitational Wave sources at the Very Large Telescope) 2024–Present
- **LS4** (La Silla Schmidt Sky Survey) 2025–Present

Grants Awarded

- Royal Swedish Academy of Sciences Grant (50,000 SEK) 2026–2027
- Royal Swedish Academy of Sciences Grant (17,000 SEK) 2026–2027
- Dahlmark Grant 2026 (9,700 SEK) 2026
- Dahlmark Grant 2025 (8,000 SEK) 2025
- Royal Swedish Academy of Sciences Grant (45,000 SEK) 2025–2026

Publications — Lead Author/Corresponding Author

6. **Singh, A.**, S. Goto, A. Sarangi, J. Johansson, C. Fransson, S. Barmentloo et al. (2026). *Nebular Phase Evolution of SN 2023ixf (I): From Circumstellar Infrared Echo to the Onset of in-situ Dust Formation in a Type II Supernova*. arXiv:2603.14137.
5. **Singh, A.**, R. S. Teja, T. Moriya, K. Maeda, K. Kawabata, M. Tanaka et al. (2024). *Unravelling the asphericities in the explosion and multi-faceted circumstellar matter of SN 2023ixf*. ApJ, 975, 132.
4. Teja, R. S., **Singh, A.**, J. Basu, G. C. Anupama, D. K. Sahu, A. Dutta, V. Swain, T. Nakaoka, U. Pathak, V. Bhalerao, S. Barway, H. Kumar, Nayana A. J., R. Imazawa, B. Kumar, K. S. Kawabata (2023). *Far-Ultraviolet to Near-Infrared Observations of SN 2023ixf: A high energy explosion engulfed in complex circumstellar material*. ApJL, 954, L12.
3. **Singh, A.**, D. K. Sahu, G. C. Anupama, B. Kumar, H. Kumar, M. Yamanaka et al. (2019). *SN 2018hna: 1987A-like supernova with a signature of shock breakout*. ApJL, 882, L15.
2. **Singh, A.**, B. Kumar, T. Moriya, D. K. Sahu, G. C. Anupama, P. J. Brown, J. E. Andrews, N. Smith (2019). *Observational signatures of circumstellar interaction and ^{56}Ni-mixing in the Type II Supernova 2016gfy*. ApJ, 882, 68.
1. **Singh, A.**, S. Srivastav, B. Kumar, G. C. Anupama, D. K. Sahu (2018). *ASASSN-14dq: A fast-declining type II-P Supernova in a low-luminosity host galaxy*. MNRAS, 480, 2475.

Publications — Second Author

6. Moriya, T. J. & **Singh, A.** (2024). *Progenitor and explosion properties of SN 2023ixf estimated based on a light-curve model grid of Type II supernovae*. PASJ, 76, 1050.
5. Teja, R. S., **Singh, A.**, D. K. Sahu, G. C. Anupama, B. Kumar, T. Nakaoka, K. S. Kawabata, M. Yamanaka, A. Takey, M. Kawabata (2023). *SN 2018gj: A Short-plateau Type II Supernova with Persistent Blue-shifted Hα Emission*. ApJ, 954, 155.
4. Teja, R. S., **Singh, A.**, D. K. Sahu, G. C. Anupama, B. Kumar, Nayana A. J. (2022). *SN 2020jfo: A short plateau Type II supernova from a low mass progenitor*. ApJ, 930, 34.
3. Kumar, B., **Singh, A.**, D. K. Sahu, G. C. Anupama (2022). *Optical monitoring of the Type Ib Supernova SN 2017iro*. ApJ, 927, 61.
2. Dutta, A., **Singh, A.**, G. C. Anupama, D. K. Sahu, B. Kumar (2021). *SN 2017hpa: A carbon-rich type Ia supernova*. MNRAS, 503, 896.
1. Kumar, B., **Singh, A.**, S. Srivastav, D. K. Sahu, G. C. Anupama (2018). *ASASSN-16fp (SN 2016coi): A transitional supernova between Type Ic and broad-lined Ic*. MNRAS, 473, 3776.

Publications — Co-Author

42. **Gangopadhyay, A.**, J. Sollerman, K. Tsalapatas, K. Maeda, N. Dukiya, S. Schulze et al. (2026). *SN 2023xgo: Helium-rich Type Icn or Carbon-Flash Type Ibn supernova?*. MNRAS, 547, 1.
41. **Ahumada, T.**, S. Anand, M. Bulla, V. Gupta, M. Kasliwal, R. Stein et al. (2026). *LIGO/Virgo/KAGRA Neutron Star Merger Candidate S250206dm: Zwicky Transient Facility Observations*. PASP, 138, 034101.
40. **Hu, Y.**, R. Lunnan, P. J. Pessi, A. Saldana-Lopez, A. Jerkstrand, J. Sollerman et al. (2026). *SN 2021aaev: A Hydrogen-rich Superluminous Supernova with Early Flash and Long-lived Circumstellar Interaction in an Unusual Host Environment*. ApJ, 999, 176.

- 39. **Gkini, A.**, C. Fransson, R. Lunnan, S. Schulze, J. Sollerman, K. Tsalapatas et al. (2026). *Eruptive mass loss less than a year before the explosion of superluminous supernovae: II. A systematic search for pre-explosion eruptions with VLT/X-shooter*. A&A, 707, A338.
- 38. **Das, K. K.**, M. M. Kasliwal, J. Sollerman, C. Fremling, T. J. Moriya, K.-R. Hinds et al. (2026). *Low-luminosity Type IIP Supernovae from the Zwicky Transient Facility Census of the Local Universe. II. Lightcurve Analysis*. PASP, 138, 024204.
- 37. **Zou, X.**, B. Kumar, R. S. Teja, D. K. Sahu, X. Chen, A. Singh et al. (2026). *SN 2024aecx: A Double-peaked Rapidly Evolving Type IIb Supernova at 11 Mpc*. ApJ, 997, 77.
- 36. **Sarin, N.**, T. J. Moriya, A. Singh, A. Gangopadhyay, K.-R. Hinds, S. Schulze et al. (2025). *Surrogate models for light curves and photosphere properties of Type II supernovae*. MNRAS, 544, 2653-2663.
- 35. **Kasliwal, M. M.**, T. Ahumada, R. Stein, V. Karambelkar, X. J. Hall, A. Singh et al. (2025). *ZTF25abjmnps (AT2025ulz) and S250818k: A Candidate Superkilonova from a Subthreshold Subsolar Gravitational-wave Trigger*. ApJL, 995, L59.
- 34. **Johansson, J.**, D. A. Perley, A. Goobar, J. L. Wise, Y.-J. Qin, Z. McGrath et al. (2025). *Discovery of SN 2025wny: A Strongly Gravitationally Lensed Superluminous Supernova at z = 2.01*. ApJL, 995, L17.
- 33. **Miller, A. A.**, N. S. Abrams, G. Aldering, S. Anand, C. R. Angus, I. Arcavi et al. (2025). *The La Silla Schmidt Southern Survey*. PASP, 137, 094204.
- 32. **Goto, S.**, M. Yamanaka, T. Nagayama, K. Maeda, M. Kawabata, D. K. Sahu et al. (2025). *SN 2023vbg: A Type IIn Supernova Resembling SN 2009ip, with a Long-duration Precursor and Early-time Bump*. ApJ, 990, 167.
- 31. **Aamer, A.**, M. Nicholl, S. Gomez, E. Berger, P. Blanchard, J. P. Anderson et al. (2025). *The Type I superluminous supernova catalogue ⊠ II. Spectroscopic evolution in the photospheric phase, velocity measurements, and constraints on diversity*. MNRAS, 541, 2674-2706.
- 30. **Rehemtulla, N.**, W. V. Jacobson-Galán, A. Singh, A. A. Miller, C. D. Kilpatrick, K.-R. Hinds et al. (2025). *The BTSbot-nearby Discovery of SN 2024jlf: Rapid, Autonomous Follow-up Probes Interaction in an 18.5 Mpc Type IIP Supernova*. ApJ, 985, 241.
- 29. **Das, K. K.**, M. M. Kasliwal, C. Fremling, J. Sollerman, D. A. Perley, K. De et al. (2025). *Low-luminosity Type IIP Supernovae from the Zwicky Transient Facility Census of the Local Universe. I. Luminosity Function, Volumetric Rate*. PASP, 137, 044203.
- 28. Das, K. K. et al. [including **A. Singh**] (2025). *Low-luminosity Type IIP Supernovae from the Zwicky Transient Facility Bright Transient Survey of the Local Universe. I. Luminosity Function, Volumetric Rate*. PASP, 137, 044203.
- 27. Sharma, Y. et al. [including **A. Singh**] (2025). *CCSNscore: A Multi-input Deep Learning Tool for Classification of Core-collapse Supernovae Using SED-machine Spectra*. PASP, 137, 034507.
- 26. Gangopadhyay, A. et al. [including **A. Singh**] (2025). *SN 2021foa: the bridge between SN IIn and Ibn*. MNRAS, 537, 2898–2917.
- 25. Pessi, P. J. et al. [including **A. Singh**] *Sample of hydrogen-rich superluminous supernovae from the Zwicky Transient Facility* Astronomy & Astrophysics, 695, A142, Mar 2025
- 24. Warwick, C. et al. [including **A. Singh**], 2025 *SN 2023tsz: a helium-interaction-driven supernova in a very low-mass galaxy* MNRAS, 536, 3588–3600
- 23. Basu, J. et al. [including **A. Singh**] (2025). *Discovery and Detailed Study of the M31 Classical Nova AT 2023tkw: Evidence for Internal Shocks*. ApJ, 980, 129.
- 22. Gkini, A. et al. (including **A. Singh**) (2025). *Eruptive mass loss less than a year before the explosion of superluminous supernovae: I. The cases of SN 2020xga and SN 2022xgc* A&A, 694, A292.
- 21. Teja, R. S. et al. [including **A. Singh**] (2024). *SN 2021wvw: A core-collapse supernova at the sub-luminous, slower, and shorter end of Type IIPs*. ApJ, 974, 44.
- 20. Lin, Z. et al. [including **A. Singh**] (2024). *The unluckiest star: A spectroscopically confirmed repeated partial tidal disruption event AT 2022dbl*. ApJL, 971, L26.
- 19. Kangas, T. et al. [including **A. Singh**] (2024). *The enigmatic double-peaked stripped-envelope SN 2023aew*. A&A, 689, 182.
- 18. Kumar, A. et al. [including **A. Singh**] (2024). *Magnetars as powering sources of gamma-ray burst associated supernovae and unsupervised clustering of cosmic explosions*. MNRAS, 531, 3297.
- 17. Gangopadhyay, A. et al. [including **A. Singh**] (2023). *Bridging between type IIb and Ib supernovae: SN IIb 2022crv with a very thin Hydrogen envelope*. ApJ, 957, 100.
- 16. Kumar, H. et al. [including **A. Singh**] (2022). *GROWTH on S190426c II: GROWTH-India Telescope search for an optical counterpart with a custom image reduction and candidate vetting pipeline*. MNRAS, 516, 4517.
- 15. Kumar, H. et al. [including **A. Singh**] (2022). *India's First Robotic Eye for Time-domain Astrophysics: The GROWTH-India Telescope*. AJ, 164, 90.
- 14. Kumar, A. et al. [including **A. Singh**] (2022). *Photometric calibrations and characterization of the 4K×4K CCD Imager, the first-light axial port instrument for the 3.6m DOT*. JApA, 43, 27K.
- 13. Dutta, A. et al. [including **A. Singh**] (2022). *SN 2020sck: deflagration in a carbon-oxygen white dwarf*. ApJ, 925, 217.
- 12. Pandey, S. B. et al. [including **A. Singh**] (2021). *Photometric, polarimetric, and spectroscopic studies of the luminous, slow-decaying Type Ib SN 2012au*. MNRAS, 507, 1229.
- 11. Kawabata, M. et al. [including **A. Singh**] (2021). *Intermediate Luminosity Type Iax SN 2019muj With Narrow Absorption Lines: Long-Lasting Radiation From a Possible Bound Remnant Predicted by the Weak Deflagration Model*. PASJ, 73, 1295.
- 10. Kumar, A. et al. [including **A. Singh**] (2021). *SN 2020ank – a bright and fast-evolving H-deficient superluminous supernova*. MNRAS, 502, 1678.
- 9. Kasliwal, M. et al. [including **A. Singh**] (2020). *Kilonova Luminosity Function Constraints based on Zwicky Transient Facility Searches for 13 Neutron Star Mergers*. ApJ, 905, 145.
- 8. Gangopadhyay, A. et al. [including **A. Singh**] (2020). *Optical studies of two stripped envelope supernovae SN 2015ap (Type*

Ib) and SN 2016P (Type Ic). MNRAS, 497, 3770.

- 7. Bostroem, K. A. et al. [including **A. Singh**] (2020). *Discovery and rapid follow-up observations of the unusual Type II SN 2018ivc in NGC 1068*. ApJ, 895, 31.
- 6. Gangopadhyay, A. et al. [including **A. Singh**] (2020). *Flash ionization signatures in the Type Ibn supernova SN 2019uo*. ApJ, 889, 2.
- 5. Coughlin, M. et al. [including **A. Singh**] (2019). *GROWTH on GW190425: Searching thousands of square degrees to identify an optical or infrared counterpart to a binary neutron star merger with the Zwicky Transient Facility and Palomar Gattini-IR*. ApJL, 885, L19.
- 4. Andrews, J. E. et al. [including **A. Singh**] (2019). *SN 2017gmr: An energetic Type II-P supernova with asymmetries*. ApJ, 885, 43.
- 3. Kumar, B. et al. [including **A. Singh**] (2019). *On the observational behaviour of the highly polarized Type IIn supernova SN 2017hcc*. MNRAS, 488, 3089.
- 2. Dastidar, R. et al. [including **A. Singh**] (2019). *SN 2016B a.k.a ASASSN-16ab: a transitional type II supernova*. MNRAS, 486, 2850.
- 1. Perley, D. A. et al. [including **A. Singh**] (2019). *The Fast, Luminous Ultraviolet Transient AT2018cow: Extreme Supernova, or Disruption of a Star by an Intermediate-Mass Black Hole?* MNRAS, 484, 1031.

★ Observational Proposals

- **Observation of supernovae in the nebular phase (PI)** — 2m HCT, India - *Semesters: 2017C2, 2017C3; 2018C1, 2018C2, 2018C3; 2019C1*
- **Observation of low-redshift supernovae (ToO proposal) (PI)** — 2m HCT, India - *Semesters: 2017C2, 2017C3; 2018C1, 2018C2, 2018C3; 2019C1, 2019C2, 2019C3*
- **Investigating host environments of 1987A-like Type II supernovae from blue supergiants (PI)** — VLT/MUSE, Chile - *Program: P112*
- **Estimating metallicities of host environments of core-collapse supernovae (PI)** — 3.8m Seimei Telescope, Japan - *Semesters: 2022B, 2023A*
- **SN 2023ixf in M101: Near-Infrared Outlook During the Nebular Phase (PI)** — 3.6m DOT, India - *Semesters: 2024C1, 2024C2*
- **Nebular Phase Imaging of Flash-SNe: Probing Dust Formation and Shock-Interaction (PI)** — 3.6m DOT, India - *Semester: 2025B-Cycle2*
- **Probing Ejecta Composition, Mixing, and Asymmetries in CCSNe (PI)** — Gemini Large and Long Program, USA - *Program: GN-2025B-LP-209, GS-2025B-LP-209*
- **Probing Ejecta Composition, Mixing, and Asymmetries in CCSNe (PI)** — Gemini South, Chile - *Program: GS-2025B-Q-304; 19.5 hr*
- **Probing Ejecta Composition, Mixing, and Asymmetries in CCSNe (PI)** — VLT/X-Shooter, Chile (P117.ALD; 7 hr)
- **Progenitor and CSM Properties of Type I SN 2024vcn (DDT) (PI)** — VLT/X-Shooter, Chile - *Program: P114.28HJ; 2.1 hr*
- **Observation of low-redshift supernovae (ToO proposal) (Co-I)** — 2m HCT, India - *Semesters: 2015C1; 2016C1, 2016C2, 2016C3; 2017C1*
- **Investigation of explosion site metallicity and CSM velocity of interacting transients (Co-I)** — 2m HCT, India - *Semesters: 2016C3*
- **Investigation of local environments of CCSNe and GRB host galaxies (Co-I)** — 2m HCT, India - *Semesters: 2018C3; 2019C1, 2019C2, 2019C3*
- **Late-phase investigation of supernovae (Co-I)** — 3.6m DOT, India - *Semesters: 2020C2; 2021C1, 2021C2; 2022C1, 2022C2*
- **Investigating observational properties of fast-evolving luminous transients (Co-I)** — 3.6m DOT, India - *Semesters: 2021C2; 2022C1, 2022C2*
- **Follow-up observations of supernovae and explosive stellar transients (Co-I)** — 3.8m Seimei Telescope, Japan - *Semesters: 2022B, 2023A*
- **Spectroscopic follow-up for rapid transients from the Tomo-e-Gozen survey (Co-I)** — 3.8m Seimei Telescope, Japan - *Semesters: 2022B, 2023A*
  - Program: P116.29DM; 7 hr
- **Nickel Production in the Candidate Pair-Instability SN 2023iop (Co-I)** — VLT/X-Shooter, Chile - *Program: P115.281K; 7.1 hr*
- **Pre-Supernova Targeted Observations of an Erupting Massive Star (Co-I)** — VLT/X-Shooter, Chile - *Program: P114.28HB; 2.6 hr*
- **Classification of transients with NOT (Co-I)** — NOT/ALFOSC, Spain - *Semester: 2025A-744097*
- **Early Warning Signs: Targeted Pre-Supernova Observations During the Rubin Era (Co-I)** — NOT/ALFOSC, Spain - *Semester: 2025A-853988*
- **A Complete Astronomical Transient Survey within 150 Mpc (CATS150) (Co-I)** — NOT/ALFOSC, Spain - *Semester: 2025A-973285*
- **Classification of transients with NOT (Co-I)** — NOT/ALFOSC, Spain - *Semester: 2025B-953586*
- **Pre-Supernova Targeted Observations during the Rubin Era (Co-I)** — NOT/ALFOSC, Spain - *Semester: 2025B-796701*
- **Surveying infant supernovae via automated AEON triggering (Co-I)** — SOAR/Goodman, Chile - *Semester: 2025B-104331*
- **A Volumetric Census of Infant Supernovae (Co-I)** — NOT/ALFOSC, Spain - *Semester: 2025B-212837*

Talks & Posters

- **Talk:** Flash Echoes and New Dust in SN 2023ixf: An Optical/NIR Portrait of a hydrogen-rich supernova — Caltech Special Seminar, Pasadena, USA. 20 Nov, 2025
- **Talk:** SN 2023ixf: NIR Evolution and Dust Formation — One hundred years of supernova science, Stockholm. Aug 2025
- **Talk:** SN 2023ixf: Shock-Powered Excess, Dust Formation and the Emerging Asymmetries from Nebular Phase Observations — An Extraordinary Journey Into the Transient Sky, Padova, Italy. Apr 2025
- **Talk:** SN 2022ffg: an interacting Type II SN with an Ultraviolet Plateau — Celebrating 20 years of Swift Discoveries, Florence, Italy. Mar 2025
- **Talk:** Heterogeneity of Type II Supernovae — OKC-Seminar, Stockholm, Sweden. Oct, 2024
- **Talk:** Strategies for Astronomy Outreach and Astrophotography in emphasizing Amateur engagement in Scientific Follow-up — Astronomdagarna 2024, Lund, Sweden. Oct 2024
- **Talk:** Unravelling the Asphericity and the Multi-faceted CSM in the nearest SN of the decade SN 2023ixf — OKC-Extreme Objects Seminar, Stockholm. Sep, 2024
- **Talk:** Multi-wavelength analysis of SN 2023ixf: Type II Supernova with a Multifaceted Circumstellar Geometry — Transients Down Under 2024, Melbourne, Australia. Jan 2024
- **Poster:** SN 2023ixf: Probing the 2nd Nearest Core-Collapse Event in the Millennium with a Multifaceted CSM Geometry — First Multi-Messenger Conference 2023, Gero, Japan. Dec 2023
- **Talk:** SN 2022jli: Multi-peaked Type Ic Supernova — Astronomical Society of Japan Meeting 2023, Nagoya, Japan. Sep 2023
- **Talk:** Photospheric Phase Evolution of SN 2023ixf — Seimei Users Meeting 2023, Kyoto, Japan. Sep 2023
- **Talk:** Estimating Volumetric Rates of Transients — India–Japan Internal Collaboration Meeting on Transients & Supernovae, Hiroshima, Japan. Mar 2023
- **Talk:** SN 2022ffg: Type IIn-L Supernova with a Plateau in the Ultraviolet Light Curve — Exploring the Transients Workshop 2022, Tokyo, Japan. Dec 2022
- **Talk:** Estimating Volumetric Rates of Transients using ZTF — Chile–Japan Academic Forum 2022, Puerto Varas. Nov 2022
- **Talk:** Applications of Machine Learning in Astronomy — Transient Workshop 2022, Hiroshima, Japan. Nov 2022
- **Invited Talk:** Investigation of Core-Collapse and Super-Luminous SNe — Supernova Workshop 2021, Online. Dec 2021
- **Poster:** SN 2018hna: A 1987A-like Supernova — SuperVirtual 2021, Online. Nov 2021
- **Invited Talk:** Follow-up of Core-Collapse Supernovae from HCT — 20 Years of the Himalayan Chandra Telescope, Bengaluru, India. Sep 2020
- **Talk:** Observational Study of Type II SN 2016gfy — Special Seminar, Hiroshima University, Hiroshima, Japan. Oct 2019
- **Invited Talk:** Observational Study of Type II Supernovae — Time Domain Astronomy Workshop 2019, Tohoku University, Sendai, Japan. Oct 2019
- **Talk:** Slow-Declining Type II SN 2016gfy; Optical Monitoring of Type IIb SN 2017gkk — ASI Meeting 2019, Bengaluru, India. Feb 2019
- **Talk:** Stellar Parameterization & Classification using Artificial Neural Networks (ANN) — Indo-French School 3: Spectroscopy & Polarimetry, IUCAA/CRAL, Pune, India. Jul 2017
- **Poster:** Optical Observations of the Type IIP SN ASASSN-14dq — ASI Meeting 2016, Srinagar, India. May 2016

Schools & Workshops

- **ZTF Summer School — MultiMessenger Astrophysics**, University of Minnesota, USA
  Jul 2022: Hands-on training in processing transient survey data from ZTF using Bayesian inference, time-series analysis, and machine learning techniques.
- **35th Jerusalem Winter School in Theoretical Physics**, Israel Institute of Advanced Studies, Jerusalem, Israel
  Dec 2017: Covered astrophysical transients including GRBs, Supernovae, Novae, TDEs, and theoretical frameworks.
- **Indo-French School 3 — Spectroscopy & Polarimetry**, CRAL-Lyon & IUCAA, Pune, India
  Jul 2017: Designed a spectrograph and polarimeter; Project: "Stellar Parameterization via ANN" (Guide: Dr. Kaushal Sharma, IUCAA).
- **Data Intensive Science (DIS) Workshop**, Inter-University Centre for Astronomy & Astrophysics (IUCAA), Pune, India
  Feb 2017: Training in Python, data visualization, machine learning, deep learning, and big data techniques.

Teaching Experience

- **English for Physics (FY 2021)**, Hiroshima Astrophysical Science Center, Hiroshima University, Japan Apr 2021 – Aug 2021
- **English for Physics (FY 2022)**, Hiroshima Astrophysical Science Center, Hiroshima University, Japan Apr 2022 – Aug 2022
- **English for Physics (FY 2023)**, Hiroshima Astrophysical Science Center, Hiroshima University, Japan Apr 2023 – Aug 2023
- **Seminar for Globalisation A (FY 2022)**, Hiroshima Astrophysical Science Center, Hiroshima University, Japan 11 Nov 2022
- **Seminar for Globalisation A (FY 2023)**, Hiroshima Astrophysical Science Center, Hiroshima University, Japan 19 Jun 2023

Mentoring

- *Undergraduate students:*
- **Ketan Sand** — Light Curves of Core-Collapse Supernovae (IIA Summer Project)
- **Sreepriya V.** — Investigation of Low-Luminosity SN 2005cs (IIA Visiting Program)
- **Kyle Tregoning** — Improving Expanding Photosphere Method (GROWTH SURF)
- **Brian Malkan** — Optical data reduction of SN 2023ixf (Case Western & Hiroshima University)

- *Graduate students:*
- **Anirban Dutta** — Observational studies of Type Ia SNe (IIA Bengaluru)
- **Rishabh Singh Teja** — Observational studies of Type II SNe (IIA Bengaluru)

Extracurricular Activity / Outreach

Member, Let's Talk Astronomy – Community Outreach during COVID-19 Lockdown Online

Apr 2020 – Jul 2020

IAU-funded astronomy outreach program conducting free online interactive sessions for school and college students during the COVID-19 lockdown; sessions introduced research in astronomy and the associated scientific and engineering challenges, explained how to pursue research careers in astronomy, and concluded with interactive question-and-answer discussions.

Volunteer, Indian Institute of Astrophysics – Outreach Committee IIA Bengaluru, India

Aug 2015 – Dec 2019

Spread awareness of research in astronomy by conducting outreach in various schools (mostly government schools), explaining the use of science in daily life through simple experiments, and linking these demonstrations to astronomical concepts.

Team Member, IIT Kharagpur Kshitij-2011 Robotics Competition IIT Kharagpur, India

Jan 2011

Designed a manually controlled robot (water raft) to retrieve objects from a simulated flood-affected area and bring them to safety; progressed to the second stage of the competition.

Other Interests

- Astrophotography, Hiking, Birding, Photography
- Badminton, Table Tennis, Snooker, Volleyball, Football